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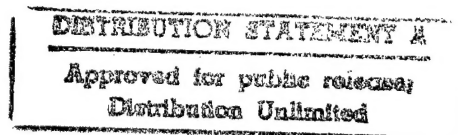
JPRS 82795

3 February 1983

# USSR Report

AGRICULTURE

No. 1370



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3 February 1983

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## CONTENTS

## POST HARVEST CROP PROCESSING

- Increase in Production, Procurements of Durem Grain Urged  
(V. Kopchenov; ZAKUPKI SEL'SKOKHOZYAYSTVENNYKH PRODUKTOV,  
No 7, Jul 82) ..... 1
- Increase in Grain Resources Seen as Key Task of Agro-Industrial  
Complex  
(I. Yakunin; PLANOVOYE KHOZYAYSTVO, Nov 82) ..... 8

## LIVESTOCK

- Research in Livestock Pest Control at Zoological Institute  
(A. Viktorov; IZVESTIYA, 23 Aug 82) ..... 19

## REGIONAL DEVELOPMENT

- Use of Scientific Achievements in Kazakhstan Agricultural Production  
(SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA, Oct 82) ..... 21

## AGRICULTURAL ECONOMICS AND ORGANIZATION

- Strengthening Finances of Agricultural Enterprises  
(V. N. Semenov; FINANSY SSSR, Dec 82) ..... 27

## AGRO-ECONOMICS AND ORGANIZATION

- Coordination Within Georgian RAPO Network  
(G. Azaurashvili; EKONOMICHESKAYA GAZETA, Dec 82) ..... 37

## TILLING AND CROPPING TECHNOLOGY

- Accelerated Development of New Crop Varieties Called For  
(R. Butenko; IZVESTIYA, 14 Aug 82) ..... 40

Genetics, Selection Produce New Plant Varieties (Yu. Tadyanski; EKONOMICHESKAYA GAZETA, Sep 82) .....	44
Future Use of Triticale Discussed (I. Petrovskiy, K. Grigorenko; SOVETSKAYA MOLDAVIYA, 30 Dec 82) ..	45
Advantages of Raising Triticale Discussed (A. Avazov, B. Umarov; KOMMUNIST TADZHIKISTANA, 9 Oct 82) .....	47

## POST HARVEST CROP PROCESSING

### INCREASE IN PRODUCTION, PROCUREMENTS OF DUREM GRAIN URGED

Moscow ZAKUPKI SEL'SKOKHOZYAYSTVENNYKH PRODUKTOV in Russian No 7, Jul 82  
pp 8-9

[Article by V. Kopchenov, head manager-inspector of the group of the Main Grain Administration of the USSR Ministry of Procurements: "Increasing Production and Procurements of Durem High-Grade Wheat"]

[Text] The decisions of the 26th CPSU Congress and the May (1982) Plenum of the CPSU Central Committee emphasize the need to increase the production and procurements of grain in the established assortment of crops and to improve their quality. Under the current five-year plan it is necessary to increase grain production to 238-243 million tons and to provide for an increase in the gross yields and procurements of the main grain crops, including durem wheat--the best raw material for the pasta industry. The implementation of this task will be an important condition for meeting one of the requirements of the Food Program which points out the need to satisfy the demand of the population for pasta items in a broad assortment.

At the present time there is a critical shortage of grain of durem wheats. But the pasta industry is experiencing a shortage not simply of durem wheat, but of the kind which meets all the requirements of GOST 9353-67 for wheat of classes I and II. High-quality pasta items are made from this grain.

Good pasta is in great demand in our country, and so far it is far from being fully satisfied because of the shortage of grain of durem high-grade wheats in state resources. We annually procure several times less than the planned amount of these wheats.

The high quality of semolina-flour necessary for producing pasta is provided if it is made from grain of durem wheat which has no less than 28 percent crude gluten and meets the corresponding requirements of quality group II. Then one obtains a dense dough which can be formed into macaroni and other items which retain their form in the process of stamping and drying. After drying these items have high durability and a yellow or light yellow color which the pasta acquires from carotene (vitamin A) which is found in the durem high-grade wheats. The consumer qualities of the pasta are also determined from the color. This is precisely the kind of pasta which is in great demand among the population; in order to satisfy this demand it is necessary

to procure for state resources a minimum of 2.3 million tons of durum wheat which meets the requirements of classes I and II of the State Standard.

The GOST for grain of hard wheat of classes I and II also envisions high requirements for its moisture content, odor, color, physical weight, vitriousness, and grain and weed impurities. One frequently hears from managers and specialists of kolkhozes and sovkhozes and also agricultural administrations at GOST 9353-67 "Durum Wheat. Requirements for procurements" is too high in terms of a whole number of indicators, and some of them, for example, the color, are not at all necessary. Yet the scientific data (All-Union Scientific Research Institute of Grain Farming, candidate of biological sciences who especially studied this problem, B. Ye. Kravtsova) show that the color reflects the vitriousness, the grain unit, and the density of grain, which decrease as the color disappears from the grain. As a result of this, not only the commercial appearance and indicators of the physical properties of the grain suffer. In colorless grain there is intensive development of harmful microflora, primarily moldy fungi. During the process of loss of color the activity of ferment increases, the acidity of the grain increases and the intensiveness of respiration increases. Grain that has lost its color discharges 2-3 times more carbon dioxide than does grain which has not lost its color. These changes in the grain make it unsuitable for prolonged storage.

Flour from grain that has lost its color is not as good as that which has retained its color in terms of the output and ash content of products of first quality milling, that is, in terms of the output of the large semolina necessary for producing pasta. Decolored wheat is not in demand on the foreign market and is regarded as not having full value. Obviously it is best not to change the GOST (although this can be done in terms of certain indicators), but to improve in all ways the quality of grain of hard wheats.

What needs to be done for the state resources to receive the necessary quantity of high-quality high-class durum wheats?

In our opinion, first of all it is necessary to unwaiveringly meet all requirements related to the distribution of the areas planted in durum wheats in zones that have the most favorable soil and climatic conditions for their production, which is frequently not taken into account when assigning procurement plans. For example, under the Tenth Five-Year Plan, with the existing procurement plans, the state did not buy a single ton of grain of high-class durum wheat from the farms of Penza, Tambov, Lipetsk, Kursk or Voronezh oblasts. The failure on the part of these oblasts to fulfill the plans was brought about not only by the violations of the agrotechnology for cultivation and the inadequate level of work related to preliminary evaluation of the quality and the formation of uniform batches of grain on the farms, but also by the planting of durum wheat in rayons with unsuitable soil and climatic conditions. The grain raised in these places is of poor quality and, as a rule, it has lost its color, has low vitriousness, and has an inadequate quantity of protein and gluten, that is, it does not meet the requirements even of class III of the standard.

At the same time the favorable natural conditions for raising high-quality grain of durum wheats are far from being fully utilized even in the main rayons where they are cultivated. Frequently in planning we do not take into account the fact that these wheats need more sun and are more sensitive to supplies of moisture and nutrition than soft wheats are, and they suffer more from weeds and root rot. All these factors must be taken into account even within one and the same oblast when planning the distribution of the planted areas and the procurements of high-class durum wheats. If one does not take these into account and plants durum wheats on the basis of the fact that they are more productive in a given rayon than soft wheats are, and does not take into account the quality of the grain that is obtained, this means that the pasta industry is deliberately being left without raw material.

For example, in Saratov Oblast the farms of 18 rayons of the Right Bank which have unfavorable natural conditions for producing high-quality grain of durum wheats, during the past ten years have not sold the state a single ton of high-class grain. And the favorable conditions of the Left Bank part of the oblast for increasing the gross yields of these wheats are inadequately utilized. Only in 1982 was this situation rectified, and the production and procurements of durum wheats are now concentrated in the Left Bank rayons.

From the example of the eastern zone of Orenburg Oblast, where many kolkhozes and sovkhozes obtain high-quality grain of durum wheats and precisely fulfill their commitments to the state one can also see how important it is to distribute plans for the production and procurements of these wheats on farms that have favorable soil and climate conditions for their cultivation. In Adamovskiy Rayon which is included in this zone the Anikhovskiy Sovkhoz, by applying correct technology for raising durum wheat and conducting a complex of work for preliminary evaluation of the quality and the formation of uniform batches of grain, annually overfulfills the plans for its sale to the state. During the years of the Tenth Five-Year Plan this sovkhov sent 11,686 tons of grain of high-class durum wheat to the grain receiving enterprises, which is considerably more than the plan called for, including 9,285 tons or 79.5 percent of class I, 1,905 tons or 16.3 percent of class II, and only 496 tons of class III. This farm received 1,028,000 rubles in increments to the procurement price for this wheat, or almost 88 rubles per ton.

During the unproductive year of 1981 this sovkhov sent the state resources 2,941 tons of high-quality durum wheat, a 3.5-fold increase over the established sales plan, and 90 percent of it was wheat of class I. Durum wheat is the most profitable crop on the farm.

Last year the Mayskiy Sovkhoz sold the state 2,234 tons of durum wheat, almost a 3-fold increase over the plan, and all of the wheat was of class I. For every ruble invested in the production of durum wheat the sovkhov received 1 ruble 52 kopecks from its sale.

The fact that the kolkhozes and sovkhozes of Adamovskiy Rayon have good yields of high-quality durum wheat shows that the eastern zone, of which it is a part, has favorable conditions for cultivating this wheat. These conditions should be utilized more fully in order to obtain more grain with high technological properties.

The Orenburg Scientific Research Institute of Agriculture (director--I. I. Gridasov) also asserts that this zone is the most favorable one in Orenburg Oblast for producing high-quality grain of durum wheats. Yet in the procurement plan for wheat for 1982 durum wheat occupies only 3.1 percent for the farms of the zone, and in the plan for procurements of durum wheat in the oblast as a whole--3.4 percent. The kolkhozes and sovkhoses of Gayskiy, Dombarovskiy, Novoorskiy, Yasnenskiy and Svetlinskiy rayons, which are also in the eastern zone, have no plans at all for the sale of grain of durum wheats to the state. This situation in the local areas is frequently explained by the fact that their productivity is less than that of soft strains of wheat. But testing at state strain testing stations located in the rayons of the eastern zones shows that durum wheats are close to strong wheats in productivity, and in individual cases surpass them. This also shows the potential capabilities of the farms in the eastern zone for increasing the production and sale to the state of high-class grain of durum wheats. For example, Khar'kovskaya-46 and Orenburgskaya-2 durum wheats planted on clean fallow surpassed Saratovskaya-29 strong wheat in terms of productivity at the Svetlinskiy state strain testing station in 1981 and were not far behind Saratovskaya-42. Under the Ninth and Tenth Five-Year Plans (annual average) on the area planted for commercial grain in all rayons of this zone the productivity of durum wheat was greater than that of soft wheat.

Adamovskiy Rayon is not the only one in Orenburg Oblast which is fulfilling plans for procurements of high-class durum wheat. Under the Tenth Five-Year Plan the kolkhozes and sovkhoses of Novosergiyevskiy, Grachevskiy, Krasnogvardeyskiy and Sorochinskiy rayons, which are part of the western zone which is favorable for cultivating durum wheats also provided for fulfillment of state orders. For example, during the past five-year plan the farms of Novosergiyevskiy Rayon sold the state 60,000 tons of high-class durum wheat, which is 14,000 tons or 32 percent more than the amount established by the plan. For this they were paid 1,354,000 rubles in increments to the price.

The Sovkhoz imeni Ekeltrozavod and the Ural Sovkhoz obtained large yields of these wheats, which made it possible for them to sell the state more than 39,000 tons of high-class durum wheat and considerably overfulfilled the plans for its procurement. Unfortunately, in Novosergiyevskiy Rayon as in Adamovskiy, the proportion of durum wheats in the plan for procurements of grain is very small, amounting to an average of 6 percent during the Tenth Five-Year Plan. Many other rayons of this zone also have great possibilities of increasing the production and procurements of high-class durum wheat.

The main plan for procurements (42.6 percent) of durum wheats in Orenburg Oblast was assigned to farms of the northern zone which is less favorable to the production of high-quality grain of these wheats, but their productivity there is higher than that of soft wheats. Under the Tenth Five-Year Plan not a single one of the eight rayons of this zone fulfilled the plans for procurements of high-class durum wheats, because of the poor quality of the grain. For example, the kolkhozes and sovkhoses of Ponomarevskiy Rayon during this period sold the state only 17,600 tons of high-class grain, or 24 percent of the procurement plan. At the same time the farms of this rayon sent the grain receiving enterprises 120,000 tons of substandard wheat,

almost 1.7 times more than the plan called for. At the same time the farms of Matveyevskiy, Abdulinskiy and Buguruslanskiy rayons of this same rayon fulfilled the five-year plan for the sale of durum wheats to the state by 95.8 and 74 percent, respectively. With more careful organization of their production and procurements on the farms of these rayons there is every possibility of selling the state considerably more high-class grain and precisely fulfilling contractual commitments. This shows that even within a single zone of the oblast it is necessary to take a differentiated approach to the distribution of the planted areas and the plans for the procurements of durum wheats.

The farms of Orenburg Oblast in the RSFSR sell the state the largest quantity of high-class durum wheats. During the Tenth Five-Year Plan they sold more than the farms of Saratov, Volgograd and Kuybyshev oblasts, Altay Kray and the Bashkir ASSR taken together. But the proportion of substandard wheat in the overall volume amounted to 64 percent, which made it impossible for the kolkhozes and sovkhozes of the oblast to fulfill the established procurement plans.

Orenburg Oblast has now taken a course toward expansion of the fallow areas and has earmarked measures for improving seed growing.

Attention must be devoted to seed growing not only in Orenburg Oblast, but everywhere. Many kolkhozes and sovkhozes of the RSFSR and the Kazakh SSR are experiencing a critical shortage of seeds of durum wheats, especially seeds of high reproductions and quality that meet classes I and II of the planting standard. For this reason they frequently do not fulfill the plans for planting durum wheats, and the gross yields that are obtained do not provide for fulfillment of the state order.

In Volgograd Oblast, for example, during the past five-year plan the plans for procurements of durum (high-class) wheats were fulfilled by only 30 of the 176 farms that had plans for these sales, and 96 kolkhozes and sovkhozes, or more than half of them, did not sell a single ton to the state. And the neglect of seed growing here was not the least important factor, which is clear from the work practice of Mikhaylovskiy Rayon in this oblast. Here many kolkhozes and sovkhozes did not plant durum wheats, and the areas planted in them decreased from 10,800 hectares in 1976 to 3,800 hectares in 1980. The Sebyakovskiy Sovkhoz in this rayon, a seed growing farm, did not produce durum wheat during the Tenth Five-Year Plan and let down many farms by not providing them with seeds.

In Saratov Oblast in Novouzenskiy Rayon because of the shortage of seeds of durum wheat the Kolkhoz imeni XXII Parts"yezd, the Krasnyy Partizan Sovkhoz and the Sovkhoz imeni Kalinin in their production plans for 1982 planned to obtain a gross yield of grain of durum wheats which was a reduction of ten-seventeenths compared to the plan for their sale to the state. For this reason the Put' k kommunizmu Kolkhoz, the Novaya zhizn' Kolkhoz and the Algay-skiy Sovkhoz in this rayon also planned to obtain gross yields of durum wheat that were ten-thirteenth--five-sevenths of the amount they were supposed to have sold to the state.



While they have plans and contractual commitments for the sale of grain of durum wheats, the production of this wheat is not being planned at all by the Zavety Il'icha, Karasevskiy, Karatal'skiy, Kutuzovskiy and Lavrovskiy sovkhozes in Volodarskiy Rayon in Kokchetava Oblast. Managers of the farms explain the situation by the shortage of seeds of this crop. But they do not choose seeds of durum wheats that have been allotted from state resources. Similar cases exist on the farms of Kustanay, Chelyabinsk and several other oblasts.

In Kustanay Oblast only the Karabalyk experimental station delivers elite seeds to the seed growing farms of the oblast for propagation. But in 1982 it was given a plan for the sale of elite seeds in the amount of 220 tons while the seed growing farms required 1,650 tons for planting.

There are also shortcomings in seed growing in many other oblasts of the Russian Federation and the Kazakh SSR.

At the present time the list of indicators of the Central Statistical Administration does not include the reports from the kolkhozes and sovkhozes concerning the availability of seed supplies of durum wheat and their quality. The production and financial plans of the kolkhozes and sovkhozes do not have a separate line for planted areas, productivity and gross yields of these wheats. Their production is planned along with other wheats. All this complicates effective control of state procurement inspections for the preparation of seed supplies and the production of durum wheats and, of course, these shortcomings should be eliminated.

These and a number of other measures will contribute to improving the organization of the production and procurements of high-quality grain of durum wheats and to successful fulfillment of the planned procurements under the Eleventh Five-Year Plan.

Shortcomings in the organization of the production and procurements of high-class durum wheats are common on the kolkhozes and sovkhozes of many oblasts. Because of violations of agrotechnology and random distribution of planning assignments, which frequently are given to the farms because the productivity of durum wheats is higher than that of soft wheats, without taking into account the quality of the grain that is obtained, the proportion of substandard durum wheat in procurements during the Tenth Five-Year Plan amounted to 91 percent in Altay Kray, 81 percent in Volgograd Oblast, 80 percent in Kuybyshev Oblast, 78 percent in the Bashkir ASSR, and 66 percent in Saratov Oblast.

In the Russian Federation as a whole during the Tenth Five-Year Plan 77 percent of the durum wheat received by the state was substandard. Had this been high-class grain the pasta industry could have manufactured approximately 3.5 million tons of high-quality pasta from it.

The existing situation with the production and procurements of high-class durum wheats cannot but arouse concern on the part of managers and specialists in agriculture and procurements in the oblasts and rayons of the RSFSR. The



ways to improve the organization of the production and procurements of these wheats with a considerable improvement in the quality of the grain were discussed in Orenburg in April of this year at the All-Russian Conference of Managers and Specialists of Agriculture and Procurements, who deal directly with this problem. At the conference they analyzed the causes of the arrears and indicated ways of surmounting them. They also criticized the kolkhozes, sovkhozes and agricultural and procurement agencies of the Tatar ASSR, Altay Kray, and Penza, Ulyanov, Chelyabinsk and a number of other oblasts which had reduced the gross yields and procurements of high-class grain of durum wheats and regularly failed to fulfill the plans for its procurement. The conference developed recommendations for increasing the production and procurements of high-class durum wheats.

At the present time it is necessary to utilize production reserves that exist on each farm and achieve high final results: increased productivity of high-class durum wheats and increased gross yields, which will make a real contribution to each farm's fulfillment of its commitments for the sale of these wheats to the state.

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## POST HARVEST CROP PROCESSING

### INCREASE IN GRAIN RESOURCES SEEN AS KEY TASK OF AGRO-INDUSTRIAL COMPLEX

Moscow PLANOVYE KHOZYAYSTVO in Russian No 11, Nov 82 pp 62-70

[Article by I. Yakunin, head specialist of USSR Gosplan: "Increasing Grain Resources--A Key Task of the Agro-Industrial Complex"]

[Text] The party, the Soviet state and all Soviet people always have and always will attach primary significance to increasing grain production--one of the main sources of satisfying the material needs of the society.

The USSR Food Program for the period up to 1990 emphasizes that acceleration and stable growth of grain production constitute a key problem in agriculture. Increased production of food products and the greater independence of our state will depend primarily on its solution.

A task has been set for the agro-industrial complex: in the next few years to satisfy the growing needs of the country for a high-quality food and forage grain and to have the necessary state grain reserves and resources for exporting it. A decisive path to achieving this goal is to increase the productivity of grain crops everywhere with stable planted areas and preservation of the crop that is raised.

While during the years of the Seventh Five-Year Plan (1961-1965) which preceded the March (1965) Plenum of the CPSU Central Committee, the country produced an annual average of only 130.3 million tons of grain, after the March plenum which earmarked a radical changeover to intensive agriculture, the productivity of grain, the production and state procurements of grain began to increase constantly, which is clear from the following figures (Table 1).

Table 1. (annual average)

	1961- 1965	1966- 1970	1971- 1975	1976- 1980	1976-1980 in % of 1961-1965
Productivity of grain crops, quintals per hectare	10.2	13.7	14.7	16.0	157
Gross yield, millions of tons	130.2	167.6	181.6	205.0	157
State procurements, mil- lions of tons	51.6	66.0	67.6	77.7	151

Under the Eleventh Five-Year Plan the development and improvement of the country's grain farming reached high levels. As compared to the Tenth Five-Year Plan grain production (annual average) should increase by 33-38 million tons, or by 16-19 percent, and state procurements--by 20 percent. There will also be an essential change in the structure of the grain purchased by the state from the kolkhozes and sovkhozes. The plan envisions a considerable increase in the volumes of its procurements for producing groats and for feed purposes (Table 2).

Table 2. (annual average, millions of tons)

	1976-1980		1981-1985
	actual procurements	% of procurements of all grain	in % of 1976-1980
Wheat	47.9	61.6	110
Including:			
strong	7.3	--	103
durem (high-class)	0.5	--	4.6-fold
Rye	3.6	4.6	169
Millet	1.1	1.4	173
Buckwheat	0.4	0.5	200
Rice	1.6	2.1	125
Corn	2.2	2.8	250
Barley	15.2	19.6	121
Including for brewing	1.6	--	144
Pulse crops	1.0	1.3	240
Oats	2.8	3.6	118

As one can see, a special place in grain farming will be occupied by corn and pulse crops which are extremely necessary for increasing the production and improving the quality of mixed feeds. The volumes of their procurements should increase 2.5-fold and 2.4-fold, respectively, as compared to the actual amounts under the Tenth Five-Year Plan. There will be a considerable increase in the procurements of durem wheat, groat crops and rye in order to improve the supply of semolina, pasta items and bread baked from rye flour.

By 1990 appreciable changes will have taken place in grain farming: the productivity of grain crops will increase to 21-22 quintals per hectare, and their average annual production under the Twelfth Five-Year Plan--to 250-255 million tons, including in the RSFSR--to 140-142 million tons, which will amount to 56 percent of the union-wide yield; in the Ukrainian SSR--53-54 million tons (51 percent) and the Kazakh SSR--30.5-31.5 million tons (12 percent).

Under the Eleventh and Twelfth Five-Year Plans there will be more difficult assignments for increasing grain production. In order to fulfill them it will be necessary to radically improve the utilization of the main means of production--the land, and also the material and technical resources allotted to agriculture as well as to raise the level of specialization and concentration in grain farming. This is dictated by the growing demand for grain, especially for feed purposes.

The July (1978) Plenum of the CPSU Central Committee set the task of increasing grain production to an average of one ton per capita in the country by 1990. The per capita grain production is the most important generalizing criterion both for the country as a whole and for the union republics. It characterizes most fully the degree of resolution of the important problem facing the agro-industrial complex and the participation in this solution by each union republic.

Taking into account the fact that the May (1982) Plenum of the CPSU Central Committee set the task of accelerated and stable increase in grain production, it is expedient to plan the development of grain farming and to carry it out in practice at more rapid rates than this is done in other branches of agriculture. It should be considered to be the main part of the branch, on which reliable provision of the country with foodstuffs and agricultural raw material, progressive structural changes in the national economy and stable and balanced expanded reproduction depend. Such an approach to grain farming is also important because grain farming is located and will be based mainly on nonirrigated land with unstable and inadequate moisture supply.

Apparently the redistribution of the material-technical and other resources in order to solve the grain problem should proceed primarily in three main directions, specifically through:

conducting planned measures to improve the training of personnel and organization in all commercial grain regions of small stable intrafarm autonomously financed collectives that specialize in grain production, and the creation of conditions for their highly productive work, including domestic conditions, making them as similar as possible to urban conditions;

radically improving work for comprehensively reducing and eliminating losses of grain both in the process of raising it and during harvesting, storage and delivering the crops that have been raised;

increasing the deliveries of mineral fertilizers (especially phosphorus) to agriculture, primarily as a result of annually increasing their production.

In this connection it should be noted that the average indicator for the country for applying mineral fertilizers per one hectare of area planted in grain crops (not counting corn) from 1976 through 1981 changed insignificantly--from 47 to 51 kilograms of nutritive substances. And in Kazakhstan it remained stable throughout the five years (in 1977--8 kilograms per hectare, and in 1981--10) and in the Ukraine it even decreased from 81 kilograms per hectare in 1978 to 76 in 1981. Losses of grain are great in the process of raising, harvesting, transporting, processing, storing and selling it. They have been increasing especially sharply during the years of large harvests, when the weather conditions are favorable for the growth of grain crops, but considerable precipitation during the harvesting period makes this more difficult.

Under these conditions a special role in the agro-industrial complex should be assigned to the creation of highly reliable and highly productive grain

harvesting equipment (combines, self-propelled reapers, specialized means of transportation and other equipment) which are capable of harvesting grain crops in almost any kind of weather in various zones of the country.

In addition to this it is important to take measures to construct elevators that are close to the places where commercial grain is produced (both along the lines of the USSR Ministry of Procurements, and on a cooperative basis between the kolkhozes and sovkhoses and the USSR Ministry of Procurements) as well as a network of reliable roads and also the creation of drying capacities and more extensive application of preservatives for preserving freshly harvested grain with increased moisture content.

The combination of drying grain in the various stages of its path from the field to the grain storing house, if necessary with preservation of freshly harvested moist grain during the first hours of harvesting, will make it possible to utilize drying capacities more effectively and to sharply reduce or eliminate losses of grain as well as to preserve its quality.

In the present stage in the development of the agro-industrial complex, along with productivity, gross yields, and per capita grain production, other criteria of the results of grain farming are becoming more important, including the grain received from one hectare of the crop rotation area and per one machine operator of the intrafarm subdivision.

The indicator of production (output) of grain per one hectare of crop rotation area is a criterion for grain farming. It is important both for the selection of the kind of crop rotation, the solution to problems of creating an intrafarm specialized production subdivision that is assigned to it and for establishing personal responsibility for the utilization of the main means of production, the land, on the one hand, and for subsequent evaluation of the effectiveness of the utilization of all factors in intensification of grain farming.

Thus as a result of many years of research (1968-1980) the All-Union Scientific Research Institute of Grain Farming (VNIIZKh) the greatest annual output of grain (13.7 quintals) per unit of crop rotation area was obtained in a 4-field crop rotation with two fields of wheat, one field of barley and one field of clean fallow. Thus the proportion of clean fallow in the crop rotation area amounted to 25 percent. Other kinds of crop rotations with a greater or lesser degree of clean fallow or a complete absence of it produced worse results.

In Stavropol Kray at the Prikumskaya experimental selection station the testing of six types of field crop rotations (1970-1975) with varying proportions of grain crops and clean fallow showed that the greatest yield of grain--17.8 quintals per hectare of crop rotation area--was obtained with a two-field crop rotation (fallow--winter wheat).

According to data of the Siberian Scientific Research Institute of Agriculture the greatest yield of grain from one hectare of arable land is provided by specialized crop rotation where 20-33 percent of the crop rotation area is clean fallow and 67-80 percent is planted in grain crops (Table 3).

Table 3. (1971-1975, annual average)

In crop rotation, %		Productivity of grain crops, %	Grain yield per 1 hectare of arable land, minus seeds
clean fallow	grain crops		
33.0	67.0	17.8	11.2
25.0	75.0	16.8	11.8
25.0	50.0	18.1	8.5
20.0	60.0	16.9	9.4
20.0	80.0	15.3	11.3
16.7	66.6	15.8	9.8
0.0	100.0	10.8	9.7

Even in crop rotations with greater productivity of grain crops (18.1 quintals per hectare) the yield of grain per unit of crop rotation area was less than in crop rotations with lower productivity but with more grain crops.

As one can see, the yield of grain per one hectare of crop rotation area is the main indicator for selecting the crop rotation which, in the final analysis, is very important for the development of the country's grain farming and a guaranteed increase in grain production.

In Omsk Oblast, for example, the area planted in grain crops in 1976-1980 as compared to 1961-1965 decreased by 369,000 hectares or 13 percent, and the area of clean fallow increased from 144,000 to 580,000 hectares or four-fold. Thus the overall area of grain crops and clean fallow increased during these years from 2,896,000 to 2,970,000 hectares (3 percent) and the proportion of clean fallow increased from 5 to 20 percent. Under these conditions grain production per one hectare of areas planted in grain crops and clean fallow increased from 629 to 1,206 kilograms, or by 92 percent.

Clean fallow plays an active role in the accumulation of moisture and nutritive substances, makes it possible to utilize the supplies of them more productively for forming the grain yield, contributes to economizing on feeds and clearing the soil of weeds, pests and diseases, reduces the need for costly technical equipment and labor force and therefore becomes an irreplaceable factor in intensification and an important means of increasing labor productivity. The kolkhozes and sovkhoses should devote special attention to promptly turning over the clean fallow and meeting the requirements for cultivating it.

The indicator of grain production per one machine operator per intrafarm subdivision is necessary primarily for large grain producing farms where crop rotations are assigned to a relatively small number of machine operators in local production subdivisions. In these labor collectives, on an autonomous financing basis, one creates operational independence, and long-range motivation to increase labor productivity, to accelerate the utilization of the achievements of science and advanced practice, and to improve the quality of work, and individuals become more responsible for the land and other fixed production capital. Labor organization in these collectives, as a rule, does not involve specific orders and the payment is piece-rate plus bonus.

During the course of many years of experiments conducted on the experimental farm of the All-Union Scientific Research Institute of Grain Farming (VNIIZKh) in brigade No 6 which consists of six machine operators and is specialized in the production of high-quality wheat, the following results were achieved (Table 4).

Indicator	Average for 1971-1975	
	VNIIZKh experi- mental farm (not including brigade No 6)	Brigade No 6
Area planted in grain crops, hectares	25,410	3,627
Use of arable land for grain crops, %	53.9	70.0*
Number of machine operators	132	6
Land assignment per machine operator, hectares	357	863
Productivity of grain crops, quintals per hectare	16.4	17.9
Production cost of one quintal of grain, rubles	5.36	3.67
Labor expenditures per 1 quintal of grain, minutes	33.7	16.4
Grain produced by one machine operator, tons	316	1,026
Cost of grain produced by one machine operator at state procurement prices in 1965, rubles	20,546	66,716

\*30% of the arable land was clean fallow

It must be emphasized that before 1967 the brigade had 24 tractors of various makes, and after they were replaced with K-700 tractors they had only six.

Moreover the experiment established that every K-700 tractor that replaced less productive tractors releases no less than 2-3 machine operators. And if one takes into account that each machine operator in virgin land regions has two family members and capital investments for each individual living in the region of the experiment amounted to 3,300 rubles, it is as though each K-700 tractor saved no less than 20,000 rubles in capital investments.

On the Sovkhoz imeni Chekhov in Uritskiy Rayon in Kustanay Oblast, the team of the USSR State Prize Winner, V. Yermakov, consisting of 7 machine operators, including the team leader, achieved considerable successes in grain production.

The collective of the team which did not have a specific order and was paid piece-rate plus bonus, and was assigned a six-field crop rotation (2,817 hectares) produced about 17,000 tons of grain during four years (1977-1980) with an average annual productivity of 19 quintals per hectare, and this means that each machine operator raised and harvested an annual average of 600 tons

of grain. The production cost of one quintal of it was 4 rubles 58 kopecks while for the sovkhos as a whole it was 1 ruble 60 kopecks greater, and the productivity of the grain crops was almost 3 quintals per hectare less.

Farms of Kletskiy Rayon in Volgograd Oblast have accumulated positive experience in the work of mechanized teams with piece-rate-plus-bonus wages and temporary advances. This is reflected in Table 5.

Table 5.

Indicator	1965	1970	1973
Number of mechanized teams, units	1	28	65
Average number of machine operators per team	10	3.5	4
Arable land assigned to team, hectares	2,653	42,012	98,963
Productivity of grain crops, quintals per hectare:			
in teams	10.8	18.2	24.7
in brigades without teams	9.4	16.6	21.2
Grain obtained per 1 machine operator, tons:			
in teams	235	578	636
in brigades without teams	150	205	233

In Kletskiy Rayon in Volgograd Oblast the mechanized teams produced almost three times more grain per one machine operator than did the brigades without teams. The nonchernozem zone, which has specific conditions for conducting grain farming, have also accumulated positive experience in the organization of grain production. Thus on the Leont'yevskiy Sovkhoz near Moscow a team consisting of four people which worked according to the system without a specific order with a complete crop rotation achieved high yields. Each machine operator of the team produced more than 450 tons of grain and labor expenditures per one quintal of output did not exceed 15 minutes; even in years with the worst weather conditions the productivity of grain crops for the team exceeded the average for the sovkhos by 4-5 quintals.

On the basis of the aforementioned experiment of the VNIIZKh, the work experience of the farms of Kletskiy Rayon and many other intrafarm subdivisions, kolkhozes and sovkhos of the country, it is expedient, primarily in commercial grain regions, to organize the work of machine operators using specialized grain crop rotations. These crop rotations should be worked out by scientific research institutions and studied along with specialized feed crop rotations with the greatest output of high-quality feeds (in feed units) and digestible protein (per feed unit) with the least possible expenditures on their production.

In order to obtain large yields of grain more rapidly with minimum expenditures on its production, it would be expedient to carry out planned organization of autonomously financed primary production subdivisions in which each machine operator would strive to obtain 300-500 tons of grain and more. The experience that has been accumulated in this matter and the availability on



the kolkhozes and sovkhoses of the necessary material and technical base confirm that this task can be carried out. Under these conditions it will be necessary to solve the problem of harvesting the grain more intelligently and more efficiently. To do this additional machine operators are required during the harvest --combine operators and drivers of trucks and other means of transportation. With the development of various subsidiary enterprises on the kolkhozes and sovkhoses and also enterprises that operate on the basis of cooperation with industry, there is a constant reserve of labor force which can be utilized during especially busy periods of field work (planting and especially harvesting the crop).

In addition to this there is now a greater need to evaluate the crop rotations and the results of the work of brigades, teams, kolkhozes, sovkhoses, rayons and specialists by using the indicator of grain production minus the seeds that were planted. The fact is that in recent years there has been a considerable increase in the expenditure of grain for seed purposes. This is largely related to the fact that winter crops die and these areas need to be replanted. Moreover, the final area planted in spring grain crops turns out to be less the preliminary one for various reasons and therefore the seeds that are planted and other expenditures must be included among the losses, and in the majority of cases it is impossible to make up for them.

Analysis shows that the dying out of planted areas is mainly because of failing to fulfill agrotechnical measures and ignoring the achievements of science and advanced practice. Under these conditions the aforementioned indicator of the results of the work of brigades, teams, kolkhozes, sovkhoses and rayons will contribute to finding the most effective ways of conducting grain farming and increasing grain production.

Many kolkhozes and sovkhoses have changed over to planting seeds of classes I and II of the planting standard, and certain ones plant seeds of class I exclusively. This makes it possible not only to save a large quantity of costly seeds, but also to increase productivity significantly. Even in seed material of class II the germinative capacity of the seeds of grain and pulse crops is no less than 85-95 percent, and this means that more than 3 million tons of grain in the form of seeds can be planted in vain, without the necessary return. And if one takes into account that the field germinative capacity of seeds of class II is less than that of class I, and that the possible appearance of weed seeds in these seeds of grain crops of class II is from 25 to 50 per 1 kilogram of the basic crop and the waste of the basic crop and impurities is 1.5-2 percent, the losses of grain will be considerably greater.

In addition to this, considerable losses are sustained by kolkhozes and sovkhoses that still plant a large quantity of hybrid corn seeds of the second generation and not the first, which is more productive, and also seeds of unregionalized strains and unclassified seeds.

Thus grain losses can be reduced sharply and grain resources can be increased if each kolkhoz and sovkhos changes over as soon as possible to planting seeds of no less than class I of the planting standard, hybrid corn seeds only of the first generation, varietal seeds and regionalized strains.

Along with this it would be expedient to change over in the shortest possible period of time to accounting for and planning grain production in terms of the mass after the completion of processing (amber mass) and to refrain from accounting and planning in terms of the initial mass for temporary storage (bunker). This will make it possible annually to take into account, distribute and compare the actual grain resources and also to take into account and compare the actual productivity of grain crops. The need for introducing such a policy is also dictated by the fact that from one five-year period to another in all of the union republics there is an increase not only in the absolute quantity of unutilized wastes, losses and rebates from prices, but also an increase in their proportion in the gross yield of grain, and this distorts the accounting and accountability in terms of one of the most important generalizing indicators.

The strong dependency of grain farming on weather conditions and, as a result of this, the considerable fluctuations in the productivity of grain crops, gross yields and state procurements of grain should be taken into account in the plans and economic activity.

The degree of fluctuation in grain production in the country can be judged from the figures presented in Table 6.

Table 6.

	Grain Production, millions of tons			Amplitude of fluctuations	
	Annual average	Maximum	Minimum	Difference between maximum and minimum, millions of tons	% of average annual volume
Five-Year Plan					
Seventh (1961-1965)	130.3	152.1	107.5	44.6	34.2
Eighth (1966-1970)	167.6	186.8	147.9	38.9	23.2
Ninth (1971-1975)	181.6	222.5	140.1	82.4	45.4
Tenth (1976-1980)	205.0	237.4	179.3	58.1	28.3

Can one expect that the fluctuation in the grain yield will cease in the future? Of course not, since it reflects a characteristic feature of our climate. Therefore predicting the productivity of grain crops and the production and state procurements of grain as a scientific and analytical stage of planning should become a compulsory constituent part of the preplanning and planning periods at all levels of agricultural administration. Only in this stage is it possible to reveal the patterns in the change in productivity, correctly evaluate them and take the necessary measures.

V. I. Lenin emphasized that recognition of objective economic laws and their conscious utilization is carried out "not only in the sense of an explanation of the past, but also in the sense of a fearless look into the future and bold practical activity directed toward its implementation . . . ."

\*V. I. Lenin, "Poln. sobr. soch." [Collected Works], Vol 26, p 75.

Data on the patterns of the fluctuations of the productivity of grain crops convince us of the need to take them into account both in calculations for the plan and in the plan, on the basis of predictions of quantitative and qualitative characteristics of objective processes (uncontrollable weather factors), using these data when developing and implementing measures for increasing the production of grain and other agricultural products.

Critically considering the fluctuation in productivity and production of grain in past years and on the basis of their possible fluctuation in the future, it would apparently be expedient to make all calculations--current and future--with an orientation toward the minimum of resources which the country can have. This will make it possible to guarantee the provision of grain and other products for the country.

The consequences of any crop failure are surmounted most easily if one envisions and creates reserves of grain, which was again emphasized at the May (1982) Plenum of the CPSU Central Committee.

The creation and accumulation of reserves on the kolkhozes and sovkhozes should take place during years when the gross yield of grain crops exceeds the planned amount. As a rule, years with a sharp decline in productivity are preceded and followed by years with greater productivity. In Stavropol Kray, for example, in 1968 the productivity of grain crops was 14.7 quintals per hectare, in 1969--9.1, and in 1970--19.9 quintals per hectare. In the same kray in 1978 the productivity was 25.6 quintals per hectare and in 1979 it dropped sharply to 10.7 quintals per hectare, but in 1980 it rose to 22.3 quintals per hectare. The creation and utilization of reserves of grain on the kolkhozes and sovkhozes will require introducing accountability to the Central Statistical Administration in terms of this indicator.

More than 800 kinds of bread and bakery items are produced in our country. We bake about 35 million tons of bread alone. Industry produces for the population a large assortment of groats, pasta, confectionary items and other items.

While in 1965 the per capita consumption was 156 kilograms of bread products (bread and pasta items translated into flour, flour, groats and pulse crops), in 1980 it was 139 kilograms, or 11 percent less. But during these years the population grew: from 232.2 to 266.6 million, that is, by almost 15 percent. Therefore the overall quantity of flour, groats and other grain products that was consumed in the country did not decrease, but increased.

In the future, as the production and state procurements of animal husbandry products, vegetables, fruits and other agricultural products increase, the consumption of grain products will decrease and be at the effective norm--110 kilograms per capita. But grain will always be the first and most important product.

Implementation of the tasks set by the 26th CPSU Congress and the May (1982) Plenum of the CPSU Central Committee in the area of grain farming will require hard and creative work on the part of millions of Soviet people, primarily those employed in the agro-industrial complex.

Their labor, directed toward increasing the production of grain, its harvesting, cultivation, transportation, storage, processing and sale of grain products will be an important contribution to raising the level of public well-being.

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## LIVESTOCK

### RESEARCH IN LIVESTOCK PEST CONTROL AT ZOOLOGICAL INSTITUTE

Moscow IZVESTIYA in Russian 23 Aug 82 p 3

/Article by A. Viktorov, Leningrad: "In Line With Practice"/

/Text/ The Zoological Institute of the USSR Academy of Sciences is one of the country's oldest scientific institutes. This year it celebrates its 150th anniversary. A correspondent of IZVESTIYA asked the director of the institute, corresponding member of the USSR Academy of Sciences O. Skarlato, to discuss the problems confronting the institute today.

"Our basic studies" related the director of the Zoological Institute of the USSR Academy of Sciences, corresponding member of the USSR Academy of Sciences O. Skarlato, "are being carried out in very diverse areas. Their results are being introduced into operational practice on an extensive scale. And this is occurring first of all in medicine, agriculture, in the forest and fishing industries and in the protection of nature.

"The theory concerning the natural focal nature of so-called transmissible diseases of man and animals, developed by the eminent Soviet scientist Academician Ye. Pavlovskiy, has received general recognition.

"One dangerous animal husbandry pest on the territory of our country is the sub-cutaneous large-horned cattle fly. In animals containing its larvae, damage occurs to the skin and the milk yields decrease. Young stock lose in excess of 10 percent of their weight increase. A senior scientific worker at the institute, K. Breyev, jointly with agricultural specialists, developed a system for protecting the cattle against this fly.

"Among other works recently introduced into operational practice, mention should be made of the creation, jointly with workers of the All-Union Scientific Research Veterinary Institute for Poultry Raising, of preparations for actively combating the so-called coccidiosis of poultry. Other works deal with protecting agricultural crops, including cotton, against pests.

"As is known, the food program approved during the May Plenum of the CPSU Central Committee has been placed in operation. The scientist-zoologists are making their contribution towards the fulfillment of this program. At the Belomorsk Biological

Station of the institute, which is located in the Gulf of Kandalaksha, experimental work concerned with the cultivation of industrial and edible mollusks -- sea mussels -- is nearing completion. It has been discovered that of all of the invertebrate animals inhabiting the White Sea, only sea mussels offer promise from the standpoint of breeding edible animals in a water medium. Their meat is rich in microelements which are beneficial to human health. There are many bays and gulfs in the White Sea which are suitable for the cultivation of sea mussels and the creation of underwater farms. We have proposed and tested a method for breeding them which involves the installation of special floats in the coastal zone of the sea. In the future the scientists will work jointly with the production workers of the Sevryb Association."

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## REGIONAL DEVELOPMENT

### USE OF SCIENTIFIC ACHIEVEMENTS IN KAZAKHSTAN AGRICULTURAL PRODUCTION

Alma-Ata SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 10, Oct 82 pp 2-3

/Article: "High Obligation of Kazakhstan Scientists"/

/Text/ The food program approved during the May (1982) Plenum of the CPSU Central Committee is advancing specific tasks concerned with intensifying the role played by science. In particular, it tasks the scientific institutes, ministries and departments "with implementing during the 1982-1990 period, measures aimed at further developing scientific studies and accelerating the introduction of scientific achievements into production operations in branches of the agroindustrial complex."

The May Plenum of the CPSU Central Committee pointed out that the food program is directed towards raising the efficiency of agriculture. And the key to accomplishing this is that of intensifying production operations. Hence, science is confronted by very important tasks. Science must participate actively in solving the increasing tasks of agriculture.

In his report delivered before the May Plenum of the CPSU Central Committee, Comrade L.I. Brezhnev emphasized: "...a chief concern today and even moreso tomorrow is that of raising cropping power. This places greater emphasis upon plant breeding and seed production. It assumes the effective use of all types of fertilizers. It demands the introduction of a scientifically sound and well thought out system of farming, one which fully takes into account the natural-economic conditions of each zone and oblast and each rayon and farm."

The agricultural scientists of Kazakhstan have carried out a great amount of work in connection with improving agriculture throughout the republic. Moreover, special importance is being attached to raising the operational efficiency of the scientific institutes and expanding their contacts with the sovkhoses and kolkhoses. A principal trend in the studies being carried out by the agricultural scientific institutes is that of creating highly productive varieties and hybrids of agricultural crops and new strains of highly productive animals and developing progressive technologies for farming, animal husbandry and so forth. A considerable amount of work has been carried out throughout the republic in the area of scientific developments. A collective of scientists at the All-Union Scientific-Research Institute of the Grain Economy (settlement of Shortandy), under the direction of Academician A.I. Barayev, developed and introduced into operations a

soil-protective system of farming which played a decisive role in combating wind erosion, in stabilizing grain production and in further intensifying the production of grain.

Non-mouldboard soil cultivation with stubble retention is being employed on farms throughout the republic on an area in excess of 20 million hectares. And the volumes of this type of soil cultivation are increasing annually. It is expected that by 1985 the area of non-mouldboard soil cultivation will have increased to 24.4 million hectares.

The soil-protective system of farming is now being used not only in the steppe regions of Kazakhstan but also in the southern Urals, the Volga region, the regions of the north Caucasus and in a number of oblasts in the Ukraine -- in all, on an area of approximately 40 million hectares. This fundamental development, which came into being in Kazakhstan, is being introduced into operations in CEMA member countries.

An important trend in studies being carried out continues to be that of further improving the soil-protective system of farming. During a study carried out on the two systems (sweep and mouldboard) in the northern oblasts of the republic, under last year's conditions, the advantage of autumn sweep cultivation of the soil in behalf of all crops, compared to the mouldboard system, was clearly manifested. The yield obtained from a second crop in a grain-fallow crop rotation plan, with use being made of sweep cultivation, amounted to 15.8 quintals per hectare compared to only 11.8 quintals for mouldboard cultivation.

Studies were carried out on non-irrigated lands in southeastern Kazakhstan aimed at improving the agrotechnical methods for protecting lands against erosion. Under the arid conditions found in the southern part of the republic, light sweep cultivation of the soil to a depth of 10-12 cm appeared to have an advantage. Moreover, the cropping power of spring barley was raised by 1.3-2.5 quintals per hectare compared to mouldboard plowing (to 20-22 cm).

Unfortunately, it must be confessed that individual sovkhoses and kolkhozes throughout the republic are still not attaching proper importance to the soil-protective system of farming. This applies in particular to certain farms in Semipalatinsk, Vostochno-Kazakhstan and Pavlodar Oblasts, where the personnel are stubbornly continuing to plow their land using plows and as a result they are obtaining low yields. The soil-protective system of farming is slowly being introduced into operations in Taldy-Kurgan, Chimkent, Dzhambul and Alma-Ata Oblasts.

The time is at hand for drawing the appropriate conclusions and for putting an end to this abnormal phenomenon. The proper measures must be undertaken in all zones aimed at introducing into operations this progressive method of the soil-protective system of farming, with the peculiarities of the farms in a region being taken into account.

An important element of the soil-protective system of farming, which is directed towards raising the cropping power of grain crops, is that of a scientifically sound development of grain-fallow crop rotation plans having brief rotations. Data supplied by the All-Union Scientific Research Institute of the Grain Economy and agricultural stations of the republic's northern grain zone has shown that four



and five-field grain fallow crop rotation plans are the most effective. Their basis is a field of clean fallow in which the accumulation of moisture is ensured, elements of plant mineral nutrition accumulate and weeds are destroyed. The results realized from the introduction of scientific achievements into production operations are clearly apparent in the republic's indicators for grain production during the 10th Five-Year Plan and the first year of the 11th Five-Year Plan.

At the same time, on farms in some oblasts -- Kustanay, Kokchetav and a number of others -- the structure for the sowing areas as recommended by the scientific institutes is not being observed. In accordance with the crop rotation plans for 1985, the area of fallow land must be increased to 5 million hectares. At the present time, crop rotation plans have been mastered throughout the republic on 68 percent of the arable land made available. As a result, a considerable portion of the sowings of wheat and other grain crops is annually being planted following poor predecessor crops and this tends to lower both the yields and the quality of the grain.

It bears mentioning that use of the progressive method of carrying out the sowing work using special anti-erosion sowing machines promotes improvements in the cropping power. The extent of their use is increasing with each passing year and has reached 21.5 million hectares, that is, the level planned for the current five-year plan.

A great amount of work is being carried out in connection with improving the fertility of solonetz soils. Important measures must be undertaken aimed at gradually drawing these lands into economic use. In the process, it should be borne in mind that a high content of exchangeable sodium and the presence of toxic salts in the soil at a shallow depth adversely affect the vitally important processes of a plant organism and lower cropping power. Improvements in the productivity of solonetz soils are possible only on the basis of special land reclamation methods being carried out. Based upon land reclamation methods already developed in the republic, 1.1 million hectares of solonetz land were mastered. The experience of leading farms underscores the high effectiveness of the land reclamation measures carried out. During the current five-year plan, the plans call for 2.1 million hectares of solonetz soil to be mastered. And there are more than 70 million hectares of such land in the republic. Thus there is an endless amount of work remaining to be carried out.

An important reserve for raising cropping power is the skilful use of mineral fertilizers, particularly phosphorus fertilizers. It has been established that an application of 1.5-2 quintals of phosphorus fertilizer per hectare serves to raise the yield by 3.5-4 quintals respectively. According to Academician A. Barayev, the annual production of grain in Kazakhstan could be raised to 50 million tons if the soil-protective system of farming was employed in an intelligent manner in all areas throughout the republic, if up to 3 quintals of superphosphate were applied per hectare and if less fertile soils were strengthened by applications of nitrogen.

At the same time, the use of chemical processes in farming continues to remain extremely low -- the lowest level compared to the country's other republics. Thus, over the past few years and on the average for the country as a whole, 85 kg of fertilizer in a conversion for active agent were applied per hectare of arable land.

In Kazakhstan this indicator was only 17.8 kg. For the Ukrainian SSR, this figure exceeds 112, the Kirghiz SSR -- 153, Lithuanian SSR -- 241 and the Estonian SSR -- 247 kg. In Hungary this figure has been raised to 304 and in the GDR -- to 350 kg per hectare.

Taking into account the advantages offered by phosphorus fertilizers, the farm leaders and specialists and chemical services must display concern for ensuring that the mineral fertilizers and chemical plant protection agents are utilized so as to produce the maximum effect. Better use must be made of local fertilizers. The agricultural scientists, jointly with the leaders of metallurgical enterprises throughout the republic, must find the possibility of utilizing phosphates for satisfying agricultural requirements. This applies in particular to applying a top dressing to clean fallow in the virgin land area. There is no limit to carrying out creative undertakings. It is a sacred task of the scientists to carry out and implement the results of such work.

The farmers are quite justified in expecting to receive assistance from the scientists, moreover assistance of a large-scale nature. The collectives of scientific research institutes, experimental stations and other scientific institutes must give more direct attention to the kolkhozes and sovkhoses and render systematic and fruitful assistance in introducing scientific achievements and leading experience into production operations.

In a report delivered before the 6th Plenum of the Central Committee of the Communist Party of Kazakhstan, member of the Politburo of the CPSU Central Committee and 1st secretary of the Central Committee of the Communist Party of Kazakhstan Comrade D.A. Kunayev stated: "At the present time there are 58 scientific research institutes and experimental stations in the republic. However, a number of them are not producing a proper return. Meanwhile, just as in the past, the republic is experiencing a sharp need for new and effective agricultural crop varieties and hybrids and livestock strains and for the development of new machine designs and technologies for the production, processing and storage of agricultural products.

The time has come for the eastern branch of VASKhNIL All-Union Academy of Agricultural Sciences imeni V.I. Lenin and all scientific institutes to raise the responsibility of their workers for reducing the periods and improving the quality of studies and for accelerating the introduction of scientific achievements into production operations, as specifically called for in the decisions handed down during the 26th CPSU Congress and the 10th Congress of the Communist Party of Kazakhstan."

The scientific institutes and agricultural scientists are under a great obligation to the agricultural workers to obtain solutions for such important tasks as the breeding of new and highly productive varieties.

It can be stated directly that our locally bred varieties are not adequate, despite the fact that a great amount of work is being carried out. Fine indicators are at hand for the Tselinnaya 26 and Tselinnaya 60 midseason maturing varieties of spring wheat. The newly regionalized Tselinnaya 21, Lyutetsens 54 and Karagandinskaya 2 varieties are being sown. The Alma-Ata Semi-dwarf variety of winter wheat has exceeded the cropping power of the standard by 12.3-16.6 quintals per hectare. However, it must be confessed that large areas of land are for the

most part occupied by the Saratovskaya 29 and Bezenchukskaya 98 wheat varieties which were regionalized in other areas. The scientists must carry out thorough, well thought out and purposeful work aimed at breeding drought-resistant and non-lodging varieties, having a high protein content in the grain, a shorter ripening period and readily adaptable to local conditions.

Such intensive crops as corn for grain, soybeans, sunflowers, cotton and sugar beets are being grown at kolkhozes and sovkhozes using the leading industrial method. Throughout the republic as a whole, use of the industrial technology in the cultivation of sugar beets is producing 40 more quintals of roots per hectare than the usual technology. Measures are being undertaken to develop industrial technologies for the production of vegetables and potatoes and to introduce vegetable crop varieties into operations. However, it must not be forgotten that, just as in the past, the cultivation and harvesting of vegetables, tobacco and fruit and berry crops continue to be weakly mechanized in field crop husbandry operations.

In recent years the republic's scientific institutes have carried out a considerable amount of work associated with improving breeding operations in animal husbandry. Measures are being undertaken to improve existing strains, pedigree groups, lines and types which are suitable for the production of livestock products on an industrial basis. The Kushumskaya strain of horses and the North Caucasus Merino and Degeresskaya strains of sheep have been approved in the republic. Nine highly productive lines of the Kazakh Belogolovaya strain of large-horned cattle have been approved.

Nevertheless, some experimental stations are performing only weak work in this regard. Completeness is lacking in the carrying out of scientific research plans. At the Taldy-Kurgan, Pavlodar and Turgay Experimental Stations, proper importance is not being attached to the role being played by the scientific councils. At the Taldy-Kurgan Experimental Station, for example, the scientific council over a period of years has failed to examine the link between science and production.

With regard to solving the tasks concerned with improving animal husbandry in Kazakhstan, special importance is being attached to those problems associated with strengthening the feed base both by means of field and meadow and pasture feed production. A specialized branch character is being attached to this work at the kolkhozes and sovkhozes. The attention of the farms has been drawn to radically improving the pasture lands in conformity with developed plans and the recommendations of the scientific institutes.

There is one example that can be followed for improving the pasture lands. The Zadar'inskiy Gosplemzavod /State Breeding Plant/ in Chimkent Oblast is achieving fine results in improving lands in the desert zone. Studies conducted by scientists of the Karakul' Scientific Production Association and the experience of the farm's sheep breeders have shown that sowings of drought-resistant prostrate summer cypress and winterfat grasses, with comparatively low capital investments, can convert low productivity lands into highly productive feed lands. These subshrubs can withstand drought conditions and heat, they have considerable forage bulk and they remain green from March to November. Approximately 10,000 hectares of prostrate summer cypress and winterfat grasslands have been created at the gosplemzavod. This is a clear result of the joint work carried out by the scientists and practical workers of the scientific-production association.

The republic's scientific institutes must display special concern for raising the level and effectiveness of applied scientific research work, the results of which have a direct bearing upon production. The agricultural experimental stations must ensure a close link between science and production.

The extensive dissemination of scientific achievements and leading experience is a matter of special importance. The party, soviet and professional trade union organizations must furnish assistance in establishing close contacts between science and production. Deserving of attention in this regard is the initiative displayed by the eastern branch of VASKhNIL which, jointly with the Alma-Ata Oblast Party Committee and the oblast executive committee, developed an all-round program for accelerating scientific-technical progress in agriculture throughout the oblast during the period up to 1990. Determinations have been made with regard to those completed scientific works which can now be introduced into production operations, their volume, place and periods and the responsible executive agents, both from the standpoint of the scientific institutes and the agricultural organs. A similar all-round program was also developed for farms in Turgay and Kokchetav Oblasts. It would be useful to adopt this valuable organizational form for use in other oblasts of our republic. Such an organizational form would promote more complete utilization of the potential of our institutes, design organizations and experimental stations.

In the work of establishing creative contacts between the scientists and sovkhoz and kolkhoz specialists, the scientific institutes, oblast experimental stations and agricultural higher educational institutes must display more initiative and furnish maximum assistance in introducing new developments into production operations.

Duplication and a lack of completeness have not yet been eliminated from scientific research work in agriculture. The work of introducing scientific achievements and leading experience into production operations has been organized to only a weak degree. Protective forestation, which occupies a special place in the complex of anti-erosion measures, instead of increasing at the present time has decreased. The plan for planting field-protective forest strips was fulfilled by only 86 percent last year. Compared to 1980, the overall area of forest strips has decreased by 2,289 hectares.

The work of correcting shortcomings requires maximum attention on the part of the scientific institutes, such that the entire arsenal of scientific achievements and leading experience will be employed in behalf of fulfilling the food program. The agricultural scientists and agricultural specialists must make a worthy contribution towards implementing the decisions handed down during the May Plenum of the CPSU Central Committee.

There can be no doubt but that the agricultural scientists and all of the republic's agricultural workers will celebrate the 60th anniversary of the USSR with new achievements in science and production.

A closer link must be achieved between science and production!

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## AGRICULTURAL ECONOMICS AND ORGANIZATION

### STRENGTHENING FINANCES OF AGRICULTURAL ENTERPRISES

Moscow FINANSY SSSR in Russian No 12, Dec 82 pp 40-48

[Article by V. N. Semenov, director of the Administration for Agricultural Financing of the USSR Ministry of Finance, board member: "The Role of Finance in the Agrarian Policies of the Party"]

[Text] The sixtieth anniversary of the USSR is a noteworthy event in the life of the Soviet people and an attestation of the historic achievements of socialism. Included among these is the social and economic transformation in agriculture.

The victory of the Great October socialist revolution opened up great possibilities for the development of production forces in agriculture. The Marxist-Leninist teaching concerning the socialist transformation of agriculture passed the test of history. Sixty years of existence for the USSR--this is the implementation of the Leninist plan for the cooperative village, for developing a large, socialist, highly-mechanized agricultural branch. In place of the 20 million small peasant farms existing in 1916 in czarist Russia, in 1980 the USSR had 25,900 kolkhozes, 1,700 interfarm agricultural enterprises and 21,100 sovkhoses which produced 88 percent of all agricultural commodity goods.

In 1919 V. I. Lenin dreamed about 100,000 first-class tractors to transform agriculture. As a result of the implementation of Leninist policies concerning the mechanization of agriculture our socialist industry supplied kolkhozes and sovkhoses with modern technology. Energy capacities in agriculture comprised 606 million horsepower in 1981 as compared with 23.9 million horsepower in 1916. The power supply per worker in kolkhozes and sovkhoses increased fiftyfold during this time. In early 1981 the number of tractors in agriculture comprised 2,562,000; of grain-harvesting combines--722,000; and of trucks--1,596,000. Basic production funds reached 227 billion rubles.

During the years of Soviet power there has been a rapid rise in agricultural production output, as demonstrated by the following table.

The growth in agricultural production output during the years of Soviet power was the result of increased productivity, mechanization and chemicalization of production, of extensive land reclamation, of improved agrotechnology and of the realization of veterinary-sanitary measures in livestock farming.

Table

	1913 millions of tons	1976-1980 (average per year) millions of tons	Growth pace, %
Grain	86.0	205.0	238
Sugar Beets	11.3	88.7	785
Potatoes	31.9	82.6	259
Raw cotton	0.74	8.9	1,203
Meat	5.0	14.8	296
Milk	29.4	92.7	315
Eggs, billions	11.9	63.1	530

Enormous success in socialist agriculture was achieved as a result of the constant concern of the party and government regarding strengthening the kolkhoz structure. The Soviet state is administered by V. I. Lenin's instructions concerning the fact that "every social structure takes shape only through the financial support of a certain class."<sup>1</sup> From the first days that the proletariat took power financial policies have been directed toward creating the most favorable conditions for the development of production forces in agriculture.

The victory of the Great October socialist revolution freed the peasantry from financial dependence due to taxes and great indebtedness. Peasants were freed from annual land rents amounting to 700 million rubles in gold. At the same time peasant debts of 1.3 billion rubles with the Peasant Land Bank were liquidated. According to the calculations of economists, the land laws passed during the first days of Soviet power benefited the peasant at a rate per household of 80 rubles on a one-time basis and 140-150 rubles annually (pre-revolutionary currency). "In a country of peasants the dictatorship of the proletariat benefited the peasants first, most of all and immediately...",<sup>2</sup> wrote V. I. Lenin regarding the practical results of the October revolution of peasant masses.

Nevertheless, the agriculture of a young socialist republic was not in a condition to satisfy the growing needs of cities with regard to foodstuffs. Small peasant agriculture, free of huge land rents and taxes, began to acquire consumer characteristics. Economic contradictions began to appear between the highly concentrated, developing socialist industry and the small peasant, semi-barter features of agriculture. The only solution to this problem was the movement from small, separate enterprises to a large highly mechanized industry. V. I. Lenin provided the economic basis for this movement via cooperation in the village.

<sup>1</sup>Lenin, V. I., "Polnoye sobraniye sochineniy," [Complete Works], Vol 45, p 371.

<sup>2</sup>Ibid., Vol 39, p 276.



The socialist transformation of agriculture was implemented according to a plan indicated by V. I. Lenin--on the lines of creating sovkhozes and kolkhozes. The establishment of the kolkhoz structure resulted in the necessity to create machine-tractor stations, which were state enterprises of the socialist type having the purpose of technically transforming agriculture on the basis of machine technology.

From the very beginning of their organization, kolkhozes have received all kinds of financial help from the state. The communist party and the Soviet government constantly follow V. I. Lenin's instructions regarding the fact that it is essential to "provide privileges of the economic, financial and bank type for cooperation."<sup>3</sup> The scale of this help was determined by those economic and political goals put before agriculture and the entire national economy at a particular stage of socialist building. During some periods of socialist building when aid to kolkhozes was insufficient this resulted in a decrease in the material interest of kolkhozes in the results of their labor and led to a slowed pace of agricultural production output.

During the difficult years of the civil war the young Soviet republic provided help to the poor peasantry in the struggle against epizootic disease in livestock, and in acquiring seed and agricultural machinery. As the country's economy became stronger financial help for the peasants also increased. At the same time collective enterprises and sovkhozes were aided by means of grants from the budget.

However, financial aid could not eradicate the great economic contradictions existing in the country. The agriculture of the young socialist republic was based on primitive technology. V. I. Lenin, noting the complexity of transforming not only agricultural production but the peasantry itself, pointed out, "The problem with regard to the small farmer can be solved, his psychology can be improved only by means of a material base, technology, the use of tractors and machines in farming on a large scale, electrification on a large scale. This would transform the small farmer radically and swiftly."<sup>2</sup>

Following Leninist precepts, the Soviet state spent large sums to import agricultural machinery and to build plants for tractor and agricultural machine building and for producing mineral fertilizers and chemicals to protect plants and animals against pests and diseases. The state also utilized currency reserves to import equipment for the plants that were being built. In the course of the first five-year plan alone some of the giants of modern machine building, such as the Stalingrad and Khar'kov tractor plants and the Rostov, Gorn', Saratov, Zaporozh'ye and Tashkent agricultural machine plants were built and construction of the Chelyabinsk Tractor Plant was coming to an end.

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<sup>1</sup> Ibid., Vol 45, p 373.

<sup>2</sup> Ibid., Vol 43, p 60.

The problem of agricultural mechanization was dealt with by means of the creation of machine-tractor stations, which contracted with kolkhozes to perform tractor and other operations involving soil cultivation, sowing and harvesting of agricultural crops and managed the production activities of kolkhozes. Barter was used primarily as a means of payment. At the same time the state financed from its budget all MTS [machine tractor station] expenditures, including capital investments. Thus, there was a barter relationship between kolkhozes and the state with regard to work done.

In connection with the 1958 reorganization of the MTS material and financial expenditures rose sharply in kolkhozes. In order to make up for this procurement prices were temporarily increased. All of this resulted in an increase in the role of finance and the distribution of gross kolkhoz income.

The Communist Party of the Soviet Union is developing agrarian policy, supporting it with the most effective economic, material-technical and organizational measures. The entry of the Soviet society into a period of developed socialism has made the problem of agricultural production effectiveness even more acute. The party program to raise the standard of living of the Soviet people depends mainly on the growth of agricultural production. However, in developmental pace agriculture lags behind industrial development. All of this has required the party to elaborate an agrarian policy that would secure a steady improvement in agriculture, a transformation in the nature of farm labor and a change in the very image of the village.

The fundamental principles for modern agrarian policy were elaborated at the March 1965 Plenum of the CPSU Central Committee. The policy line indicated by the plenum was further developed at subsequent plenums of the CPSU Central Committee and party conferences. The party developed an orderly system of economic measures to further develop agricultural production, which is being enriched with new content in connection with the progressive movement of our society on the path toward communism. Agrarian policy is an integral part of the general political course of the CPSU. Agricultural development is examined as an organic whole with economic and social party policy at the modern stage of development of the communist society. Developed socialism is characterized by a fuller utilization of the advantages of planned economic management, by the coming together of two forms of socialist property--public and kolkhoz-cooperative--which finds its concrete expression in the form of wages for labor, social security and social insurance and the financing and crediting of kolkhozes and sovkhozes.

Modern agrarian policy arises from the necessity to create economic conditions that will stimulate the growth of agricultural production output, a sharp increase in capital investments, the realization of a long-term complex program of mechanization and chemicalization in agriculture and of land reclamation, the development of agrarian science and the perfection of forms of organization and management. This policy, developed during the March 1965 Plenum of the CPSU Central Committee and other plenums and party conferences, has become the basis for the practical activity of party, soviet and agricultural organs, kolkhozes and sovkhozes.



During the last three five-year plans the volume of capital investments in agriculture comprised about 400 billion rubles, which is four times more than during all of the preceding years of Soviet power. As a result of this fund supplies per 100 hectares of agricultural lands increased by a factor of 3.4 as compared with 1965; the capital-labor ratio increased by a factor of 3.7.

After the May 1966 Plenum of the CPSU Central Committee a large volume of reclamation work was completed in the country. In 15 years over 15 million hectares were reclaimed. As of late 1980 the fund of drained lands in kolkhozes and sovkhozes reached 13.7 million hectares; of irrigated lands--17.3 million hectares. The proportion of gross farming output on irrigated lands comprised 29 percent in 1980.

The volume of chemicalization in agriculture has increased immeasurably. In 1980 82 million tons of mineral fertilizer were supplied to agriculture (standard units), which was triple the amount supplied in 1965. There has been a sharp rise in the use of mineral feeds and chemical and biological means for protecting plants.

In addition to the strengthening of the material-technical base in agriculture extensive capital investments have been made in the branch of the agroindustrial complex, related to the processing of agricultural products and the supplying of agriculture. Whereas in 1961-1965 16.5 billion rubles of capital investments were directed into this area, in 1966-1980 the average for the 5 year period was 42.6 billion rubles, or an increase by a factor of 2.6.

The policies on strengthening the economies of kolkhozes and sovkhozes and on improving the material incentives of agricultural workers to take an interest in the results of their work have been followed consistently. Procurement prices were raised for kolkhozes and sovkhozes and there were 50-percent bonuses for above-quota sales of agricultural products. Direct bank credit for kolkhozes was introduced, there was a change to guaranteed wages for kolkhoz farmers according to sovkhoz norms and rates. Pensions were increased. Sovkhozes were changed to new management conditions and state property insurance was made to include them in the way kolkhozes were insured. The supplementary income to kolkhozes and sovkhozes due to increased procurement prices and to the realization of other measures comprised 240 billion rubles in 1965-1980.

The realization of the agrarian policies developed by the March 1965 Plenum of the CPSU Central Committee has secured a considerable growth in agricultural production output in the country. During this period gross production increased by a factor of 1.5, and all growth was achieved while curtailing the number of workers occupied in the public sector by 2.9 million persons. The growth of labor productivity by a factor of 1.8 was encouraged by the increased productivity of crops and animals and by the introduction of progressive forms of labor and production organization.

The modern period of development of socialist society in the USSR has as one of its main goals an improvement in the standard of living of the population. The real income of the population doubled in 1980 as compared with 1965. The monetary income of the population is increasing. As of 1 January 1981

savings accounts alone held 156.6 billion rubles, which exceeds 1965 savings by a factor of 8.4.

The decisions of the 26th CPSU Congress confirmed that during the 1980's the communist party will consistently implement economic strategy, the highest aim of which is the steadfast improvement in the material and cultural level in the life of the people. The "Basic Directions of Economic and Social Development in the USSR in 1981-1985 and in the Period to 1990" call for a 13-16 percent increase in the average monthly wages of workers and employees to bring wages to 190-195 rubles per month by the end of the five-year plan, which will increase demand for consumer goods.

With an increase in the population by over 35 million people during the last three five-year plans the demand for meat has increased by 21 percent, for milk--by 28 percent, for eggs--by a factor of 1.9, for vegetables--by 35 percent, for vegetable oil--by 24 percent and for sugar--by 30 percent. However, the growth in the monetary income of the population in the face of stable state retail prices for basic food products resulted in increased demand for them. Increased demand for foodstuffs is also due to the growth in the urban population, and to increased purchases of foodstuffs by the rural population within the state trade network. With the insufficiently rapid growth in agricultural efficiency demand for foodstuffs is surpassing supply. In connection with this demand for meat and dairy products, vegetables and fruit cannot be fully met.

Based on party resolutions concerning improvements in the standard of living of the population and on a realistic evaluation of the status of agriculture the May 1982 Plenum of the CPSU Central Committee passed measures to radically alter the development of agricultural production. The plenum approved the Foodstuffs Program of the USSR for the period until 1990, which was developed in accordance with the decisions of the 26th CPSU Congress, and confirmed the resolutions of the CPSU Central Committee and the USSR Council of Ministers concerning its realization.

The Foodstuffs Program calls for the utilization of the increased economic potential of the country, supplying the population with all types of foodstuffs according to demand in the shortest possible time and improving considerably the structure of nutrition of the Soviet people by increasing the consumption of the most valuable products.

During the 12th Five-Year Plan it is planned to increase average annual grain production to 250-255 million tons, meat production--to 20-20.5 million tons, milk production--to 104-106 million tons, vegetable production--to 37-39 million tons, and fruits and berries--to 14-15 million tons. During the 12th Five-Year Plan emphasis will be placed on increasing per capita consumption of meat, vegetable oil, fruit and vegetables.

The following per capita consumption of basic foodstuffs is planned for 1990 (kg):

	1980	1990
Meat and meat products	58	70
Fish and fish products	17.6	19.0
Milk and milk products	314	330-340
Eggs, number of	239	260-266
Sugar	44.4	45.5
Vegetable oil	8.8	13.2
Vegetables and melons	97	126-135
Fruits and berries	38	66-70

In order to achieve the volume of agricultural production output and consumption planned by the Foodstuffs Program an interrelated, more balanced development of all branches of the agroindustrial complex is planned. Of priority importance are material and technical supplies.

During the decade agriculture is to be supplied with 3,740,000-3,780,000 tractors, 1,170,000 grain harvesting combines. The supply of mineral fertilizers will increase by a factor of 1.7, and by 1990 the area of irrigated land will reach 23-25 million hectares. During the two five-year plans technological equipment worth 17-18 billion rubles will be allocated for the foodstuffs industry, state trade and consumer cooperatives.

During the 11th Five-Year Plan 233 billion rubles of capital investments are being directed into the branches of the agroindustrial complex, including 189.6 billion rubles for agriculture; during the 12th Five-Year Plan the figures will be 33-35 percent and 27-28 percent respectively of the total volume of capital investments in the national economy.

These funds must first be allocated for the development of capacities in order to increase food production in the shortest time possible, for technical reequipping, for the expansion and renovation of existing enterprises and production facilities and for the acceleration of the operational starts of structures that are under construction. In agriculture capital investments will be utilized to increase soil fertility, to create a stable feed base for livestock raising and capacities for the primary processing of products, to build storehouses and storerooms and to renovate and expand livestock facilities. A great deal of attention will be given to the social development of the village and about 160 billion rubles will be allocated for this purpose in the course of the decade.

At the same time the plenum recognized the necessity of implementing a complex of measures directed at strengthening economic self-financing in kolkhozes and sovkhoses and at strengthening material interest in increasing production and improving the quality of products. Within the system of these measures great significance is attached to improving the economies of low-profit kolkhozes and sovkhoses. Low profits and the losses incurred by many enterprises give rise to dependence and depress the stimulus to increase agricultural production output. Almost 40 percent of all long-term loans issued to kolkhozes and sovkhoses for capital investments and short-term credit for production expenditures were extended for long periods of time.

As a result of the plenum's decisions low-profit kolkhozes and sovkhoses have not had to repay debts to Gosbank valued at 9.7 billion rubles. The debts are reimbursed by means of resources remaining in the state budget of past years. In addition, such kolkhozes and sovkhoses will be able to defer debts to Gosbank for 10 years, and they will have to be repaid beginning in 1990. For loans that are deferred enterprises do not have to pay interest for the credit.

With the goal of creating stable economic conditions for kolkhozes and sovkhoses as of 1 January 1983 procurement prices for agricultural products will be raised and bonuses will be given for products sold to the state by low-profit and losing kolkhozes and sovkhoses at a rate of 16 billion rubles annually. Of the total amount allocated 6 billion rubles have been directed at increasing procurement prices and 10 billion--at providing bonuses to prices for kolkhozes and sovkhoses operative at a low profit or at a loss. The resources earmarked for bonuses to prices have been allocated to the councils of ministers of union republics, which are to distribute them to oblasts and krais. Oblast executive committees, upon receiving papers from rayon agroindustrial associations, confirm the lists of kolkhozes and sovkhoses operating at a low profit or a loss and the amount of the bonus added to the procurement price. The bonuses are paid to kolkhozes and sovkhoses by procurement organizations at the same time that the products sold to the state are paid for.

With the realization of the decisions of the May Plenum of the CPSU Central Committee procurement prices were increased another 5 billion rubles by the cancellation of budget compensation of increased costs due to increased prices for gasoline as of 1 March 78 and increased wholesale prices and tariffs for industrial products and services as of 1 January 82. This measure did not increase the profit level of agricultural production, but it enabled us to more efficiently distribute among enterprises those extensive financial resources that are being directed by the party and state at the development of agriculture and at the realization of the USSR's Foodstuffs Program.

As a result of increasing procurement prices and establishing bonuses for kolkhozes operating at a low profit level or at a loss, the subsidies for milk will increase by 5.1 billion rubles and those for meat by 8.9 billion rubles. These subsidies are based on party policy aimed at stabilizing retail prices for basic food and non-food commodities. In connection with this in 1983 meat and milk subsidies will reach 39 billion rubles.

In dealing with the foodstuffs problem, the communist party is giving considerable attention to the social questions in the village and to strengthening the economies of low-profit kolkhozes. In this regard the financing of entire programs in kolkhozes suffering from low profits or losses is a new approach both in theory and in practice.

Kolkhozes with insufficient fixed capital and without their own resources to finance expanded production will be able to utilize the sovkhos system of financing by means of resources from the state budget for the following planned

expenditures: for the construction of residential dwellings, children's pre-school enterprises, clubs and other structures used for cultural and communal purposes and for the construction of intraenterprise roads. Kolkhozes operating at a low profit or a loss can utilize the sovkhoz system of payments via budget insurance payments for property insurance.

The financing of entire programs in low-profit kolkhozes is implemented according to a list confirmed by the council of ministers of the union republic. Included in this list are the enterprises, the total profits of which (ratio of clear income to cost of production) did not exceed 10 percent during the last 3 years. Also financed from the budget are kolkhozes with profit levels above 10 percent but that did not cover credit received earlier from Gosbank, the financing of capital investments and other plan measures and kolkhozes with small fixed capital funds, poor intraenterprise road networks and insufficient amounts of clear income. The lists of low-profit kolkhozes are confirmed for a number of years. The lists are adjusted according to the changes in profit levels and fixed capital supplies of kolkhozes.

Allocations for the financing of entire programs in low-profit kolkhozes will equal 3.3 billion rubles from the budgets of union republics annually. These resources will be distributed in accordance with the limits on capital investments provided by material-technical resources for the building of objects earmarked for cultural-communal purposes and of intraenterprise roads, on expenditures for the upkeep of children's and cultural-educational institutions as well as on the size of insurance payments.

The financing of road building and the building of cultural-communal structures is realized within the limits of estimated costs of the structures and the limits of capital investments of low-profit kolkhozes supplied with material and technical resources. As for the upkeep of children's preschool and cultural-educational institutions and pioneer camps, including expenditures to acquire inventory and equipment for cultural-communal purposes and the carrying out of mass cultural work, they are financed within the limits established for state agricultural enterprises. Financial organs make allocations to agroindustrial associations as repayment of expenses involving insurance payments made for kolkhozes operating at a low profit or at a loss.

Allocations for the financing of entire programs in such kolkhozes are made to agroindustrial associations in accordance with quantities planned in the budgets of union republics with a consideration of their economic and financial condition. For this reason the proportion of the budget needed for financing may vary.

In accordance with the decisions of the May 1982 Plenum of the CPSU Central Committee a whole series of measures have been taken to increase the interest of kolkhoz farmers and sovkhoz employees in increasing production and the sale of agricultural products.

Extensive material and financial resources are required to put through the measures to increase foodstuffs as indicated by the Foodstuffs Program, resources that are available only to a socialist country with a developed economy.

State expenditures for the realization of the Foodstuffs Program and for increasing the material interest of workers in increasing agricultural production output comprise:

	(billions of rubles)
Supplementary income of kolkhozes and sovkhozes due to increased procurement prices and other measures	21.6
Cancellation of bank loans	9.7
Deferred bank loans	11.1
Measures to secure cadres and to stimulate workers to increase production output	1.8
<hr/>	
Total	44.2
including for 1982	20.8

For the realization of the USSR's Foodstuffs Program 44.2 billion rubles have been allocated, as compared with the 8 billion rubles planned for agricultural development by the March 1965 and the 15.6 billion rubles planned for the same purpose by the July 1978 plenums of the CPSU Central Committee.

The allocation of such large capital investments requires purposeful work to raise the level of management in kolkhozes and sovkhozes, rayon and oblast agroindustrial associations and in all links of the complex. In connection with this there should be a strengthening of the effect of the financial-credit mechanism on kolkhozes and sovkhozes with the aim of more efficiently utilizing land, machinery, fertilizer, feed and fuel and all production potential for increasing production output.

A strong material and technical base has been developed and measures have been taken to strengthen the economies and financial status of kolkhozes and sovkhozes with the goal of increasing the effectiveness of agricultural production. There is a transition toward planning within the agroindustrial complex and toward its management as a unified whole at all levels. Surplus or repetitive links are being eliminated and there is an increase in the responsibility placed on each link for increasing production and improving the quality of foodstuffs for the population. Measures are being elaborated to increase economic independence and initiative in kolkhozes and sovkhozes as the main links in socialist agriculture, to create more favorable economic and social-organizational conditions for effective operations and to eliminate departmental isolation. The goals established by the 26th party congress and the May 1982 Plenum of the CPSU Central Committee regarding increasing the effectiveness of agricultural production and the quantity of food require further improvements in economic relations between the branches of the agroindustrial complex. The financial-credit mechanism, a powerful instrument in implementing the party's agrarian policies, must be improved constantly, acquiring qualitatively new forms in accordance with the building of the communist society. The 60th anniversary of the USSR demonstrates the dependability of the financial-credit mechanism in the social and economic transformation of agriculture.

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8228

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## AGRO-ECONOMICS AND ORGANIZATION

### COORDINATION WITHIN GEORGIAN RAPO NETWORK

Moscow EKONOMICHESKAYA GAZETA in Russian No 52, Dec 82 p 10

/Article by G. Azaurashvili, 1st deputy minister of procurements for Georgian SSR, Tbilisi: "Within the Framework of the RAPO"/

/Text/ Agroindustrial associations are increasing in force in a majority of the rural regions of Georgia. Today they are already uncovering reserves for the production of agricultural goods and they are accomplishing a great deal towards reducing those product losses which occur between the fields and the consumers and also towards supplying the dining tables of our workers with more abundant and diverse food products.

A decisive link in the implementation of the food program -- the fields, farms, orchards and plantations. But growth in the production of food products is directly dependent upon rational and faultless organization of the work of the procurement, transport and processing enterprises. Deserving of priority attention are those problems concerned with comprehensive cooperation and efficient interaction among all branches of the agroindustrial complex based upon a business-like partnership. It was by no means an accident that this task was viewed as a priority one during the May (1982) Plenum of the CPSU Central Committee.

It was precisely from this standpoint that the collectives of enterprises of the Ministry of Procurements for the Georgian SSR joined in the work of implementing the food program developed by the party. Our grain receiving, mixed feed and milling enterprises are now operating within the framework of agroindustrial associations. And although unresolved problems still exist at the present time, their number is less owing to the fact that there is but one policy line. This unity is ensured at the very levels where it must be ensured -- in each association and ministry.

We have one goal -- achieving high profitability for each enterprise and for the RAPO /rayon agroindustrial association/ on the whole, carrying out all tasks planned, improving the quality of the final products and achieving more thrifty and objective utilization of the centralized funds of each association. Obviously, this unity did not come of and by itself. During the first stage, not everything was understood by everybody. We in the ministry foresaw this and thus during the first quarter of this year, after agroindustrial associations had been created in all of the rayons, we conducted our own seminar-conference for the branch, for the



leaders of enterprises associated with the RAPO. This measure was not carried out without leaving some record of note: a mechanism for administering the work of the collectives was worked out during it.

We created a permanent committee, headed by a deputy minister, which is responsible for the status of the work being performed by the branch's enterprises within the framework of agroindustrial associations.

The following innovation serves as an example of business-like partnership and the joint solving of problems that arise: a system was established this year in accordance with which the plans for producing mixed feed and flour and for accepting and distributing grain and problems concerned with the distribution of financial resources and improving the quality of products are examined in the ministry on a mandatory basis, with participation by the leaders of the agroindustrial associations.

Under the new conditions of management, noticeable improvements have taken place in the work being performed by our enterprises, their logistical base has been strengthened and the kolkhozes, sovkhozes and inter-farm enterprises are being provided with practical assistance in the organization and construction of mixed feed preparation shops. Such shops have already been built and are in operation in Gurdzhaanskiy, Gardabanskiy, Goriyskiy, Abashskiy, Zestafonskiy, Akhalkalakskiy, Sukhumskiy, Kaspkiy and some other rayons throughout the republic.

And both sides -- the rayon associations and the enterprises of Minzag /Ministry of Procurements/ -- must be equally interested in the profits and profitability. This is why the leadership of the ministry is presently directing its enterprises to establish direct business-like relationships with the farms, enterprises and other branches included in the RAPO structure.

The operational experience of the Kutaisi Grain Products Combine is deserving of attention. Here strong contacts have been established with poultry factories located within the combine's zone of services. The combine is now continuously supplying the poultry factory with high quality mixed feed and in this way it is making a contribution towards increasing the production of poultry meat and eggs. And when the monthly and quarterly results of the production-financial activities of the grain products combine are examined in the ministry, the work results of all of the poultry factories serviced by it must also necessarily be taken into account. It bears mentioning that the Kutaisi workers have turned out to be conscientious partners.

The state inspections for procurements and the quality of agricultural products, of the Ministry of Procurements system, bear a great amount of responsibility for organizing coordinated work by the enterprises and organizations belonging to agroindustrial associations. Indeed, these inspections constitute an important link for ensuring fulfillment of the state procurement plans and contractual agreements for agricultural products and for coordinating and exercising state control over the activities of all enterprises and organizations engaged in the production, procurement, processing, sale and shipments to the all-union fund of agricultural products.

Changes have taken place in the work being performed by the state inspections: they conduct inspections on the fulfillment of contractual agreements jointly with



RAPO specialists and all problems uncovered are reported to the management of the association and to our ministry. The decisions handed down based upon the results of inspections are developed jointly and this aids in correcting the shortcomings in an efficient manner.

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## TILLING AND CROPPING TECHNOLOGY

### ACCELERATED DEVELOPMENT OF NEW CROP VARIETIES CALLED FOR

Moscow IZVESTIYA in Russian 14 Aug 82 p 3

[Article by R. Butenko, corresponding member of the USSR Academy of Sciences:  
"Selection Accelerator"]

[Text] The Food Program has set for selection workers an important and difficult task--to create new strains of agricultural plants that are distinguished not only by high productivity, but also by resistance to diseases, pests and bad weather. In order to carry out this task it is necessary to intensify the selection process which is based on methods of hybridization and selection of the best descendants which have been proved throughout the years.

But traditional methods alone are no longer adequate. It is necessary to take new approaches to the creation of diverse initial forms for selection and selective use of valuable genes in plants. Scientists and also selection workers in practice must manipulate the hereditary material of plants in such a way as to sharply increase their usefull potential in the shortest possible periods of time.

The basis for carrying out this and other tasks can be the utilization of approaches and devices of cellular and genetic engineering. During the past decade there has been considerable improvement in the methods of cultivating plant tissues, cells and so-called isolated protoplasts (cells without their external covering) outside the organism in artificial nutritives. This has opened up quite realistic possibilities of manipulating the genes in an individual cell, separating them from the plant, and then regulating their reproduction, their differentiation and their capability for producing a basis for a new plant. As a result of this work, even today fundamental science can offer practitioners a number of effective devices and methods. Some of them facilitate the traditional process of obtaining new strains of plants and others open up principally new possibilities.

I shall give a couple of examples of cellular technologies which pertain to traditional selection practice. It has long been known that crop strains of plants can become hardier as a result of remote hybridization with related wild plants, which are more resistant to diseases and unfavorable factors in the environment. But on this path there have always been difficulties related to the physiological and genetic incompatibility of the parent plants. Incompatibility can be manifested in the inability of the paternal pollen to grow

on the stigma of the maternal plant, in the halting of the growth of the pollen tube which delivers the spermium to the ovicell, in the death of hybrid embryos in various stages of development and, finally, to the death of young shoots.

These difficulties are overcome with pollination and fertilization of isolated ovaries. It is possible to place the ovule in a test tube and place the fertilized pollen directly on it. Raising isolated embryos and ovules in artificial nutritive environments in many cases makes it possible to obtain adult hybrid plants.

It is extremely promising to use callus tissues of the plant for these purposes. This requires a certain amount of explanation. The word "callus" in Latin means callous. Everyone has probably seen "callouses" on plants--those burls of cells which grow on the places where the plants have been cut. Callus tissue also begins to grow from an isolated cell when it is separated in a nutritive environment. Then it is as though the cells forget their specialization and grow as some kind of unorganized mass and not as stalks, leaves and roots.

But each cell retains all of the hereditary information inherent in a given plant. Under the influence of hormonal influences the cells of the callus tissue can produce a basis for a new plant. Thus it is possible to raise the necessary plant from the cells of hybrid embryos or shoots, whose development has been blocked because of the genetic incompatibility of the partners in the crossing.

An extremely promising device which accelerates the selection process is experimental creation of haploid plants in a culture of isolated anthers.

And here again it is necessary to give the reader a small explanation. A half set of chromosomes is called haploid. It is formed when the hereditary information is transferred to the offspring as a result of dividing the complete set that usually exists in the cells. The pollen cells contain an incomplete set of chromosomes. If they are isolated and grown in a nutritive environment they become mature pollen and begin to divide and form either a mass of callus or an embryonic structure. In either case it is possible to obtain an adult plant. It will be distinguished from the ordinary plant by the fact that it does not have a double set of various chromosomes from two parents, but only one. It can be doubled experimentally (which is necessary for any plant), but the chromosomes will be completely identical.

This is a very important result for the work of geneticists and selection workers. For crossing pure lines they need plants which from generation to generation have the same useful quality (for example, a short, nonlodging stalk). With the ordinary method they need many years in order to isolate such a line. The culture of isolated anthers makes it possible to obtain it considerably more rapidly.

It is important not only to isolate a new strain, but also to propagate it rapidly and reliably. The method of microcloning helps here.

The most actively growing parts are separated from the necessary or useful plant --the buds, parts of the stalk and the roots. They are placed in a test tube in a nutritive environment. Plants which repeat the initial ones grow from each of the parts. These are so-called clones. Parts are separated from them, in turn, and again are propagated. Then the propagated plants are transferred to the soil.

The method sharply accelerates the propagation of a new strain. For example, the time for propagating a grapevine is decreased to one-fifth of the usual amount of time. It is possible to obtain up to a million plants from one initial specimen during a year. And the planting material is resistant to bacterial and, in a number of cases, virule diseases. It is in no danger of infection during the time of propagation. The profitability of the new method of propagation is increased because of the reduced planted areas and the reduced labor force as compared to the ordinary method of propagation.

An area which is new, but extremely promising for the immediate future of selection work is the utilization of cryobanks, or storehouses with a low temperature. The bank, where the pollen, cells and tissues of the plants are kept in liquid nitrogen at a temperature of -196 degrees Celsius, retains the set of strains and species which the selection workers need. This facilitates the crossing among plants which are considerably different in terms of the blossoming time. Moreover, this way it is not necessary to raise the complete collection of species on the fields each year. The storage difficulties during the winter are also eliminated.

Specialists in the culture of cells and tissues of plants have also developed more complicated methods which presuppose the introduction of principally new methods into plant selection. The utilization of isolated protoplasts is very important. Here again it is necessary to turn to a detailed explanation.

Cells of various species and varieites of plants that are bare, which have lost their external covering, have an extremely useful capability of merging. From such a hybrid protoplast it is possible to obtain an entire plant with new properties. This method is applied when it is necessary to overcome the incompatibility of the parent forms, a barrier which cannot be crossed over with the ordinary crossing.

It is very important for the isolated proplasts to be able to absorb large particles. This makes it possible to introduce into them molecules and parts of cells that bear new information. Here one can hope that on the basis of the new information the protoplasts, the cells and then the plant will acquire new characteristics.

Far from all of these methods of genetic engineering can be utilized by practitioners today. They still need scientific development. One of the main obstacles is the fact that in far from all of the cases is it possible to obtain a complete plant from an individual cell. For a whole number of important agricultural plants--rice, barley, potatoes, tomatoes, alfalfa, clover, rape and several others--this is possible, but for others, including wheat, rye and pulse crops, we are still unable to do this.

Methods of cellular engineering have justified themselves, particularly for obtaining a new form of potatoes. This work was conducted by the Institute of Plant Physiology of the USSR Academy of Sciences in conjunction with the Ukrainian SSR Institute of the Potato Industry. They managed to obtain an interspecific somatic hybrid. It is distinguished by a number of valuable properties, including absolute field resistance to virus, which causes one of the most difficult diseases of potatoes. This valuable property made it possible to include the new hybrid in the selection programs for obtaining new strains.

And, finally, a couple of words about the possibilities of transferring individual genes to plant cells. While up until recently this sounded fantastic and was not based on reliable facts, now the work of molecular geneticists and biologists has demonstrated this possibility. Bean genes which are capable of synthesizing protein were transferred to the cells of sunflowers. Thus they obtained a cell line where the genes synthesize the bean protein in the sunflowers as well.

Practice has already proved the prospects of cell technologies which have been suggested for assisting selection workers by fundamental science. Practical selection workers, as a rule, believe not words but deeds. This is why it is important to have in the leading selection institutions of the country specialized groups who have mastered the methods of the culture of tissues and cells and create cell technologies for selection workers. Such groups--created in the All-Union Selection and Genetic Institute of VASKhNIL in Odessa, the Institute of Feeds imeni V. R. Vil'yams, the institutes of potato raising of the RSFSR and Ukrainian SSR ministries of agriculture, the Institute of Rice, the Magarach scientific production association for grape growing, the Institute of Mountain Gardening and Flower Raising of the USSR Ministry of Agriculture and others--have already been recognized by practitioners. Under the current five-year plan these institutions, many of which are participants in a comprehensive special-purpose scientific program for biotechnology, plan to obtain initial forms for selection and strains using methods of cellular technologies.

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## TILLING AND CROP TECHNOLOGY

### GENETICS, SELECTION PRODUCE NEW PLANT VARIETIES

Moscow EKONOMICHESKAYA GAZETA in Russian No 39, Sep 82 p 19

[Article by Yu. Tadyanski (Odessa): "Automation and Selection"]

[Text] More than 50 strains and hybrids of agriculture crops created by scientists of the All-Union Selection and Genetics Institute (Odessa) are being cultivated on the fields of the country. The harsh winter and the hot summer, the early spring and the bountiful autumn--these various seasons now contribute to the work in the greenhouses and rooms of the institute's artificial climate station. With the help of automation they maintain a given temperature, humidity and light supply. Scientists annually obtain up to five harvests here.

"Our phytotron is the largest in Europe," says the institute's deputy director, Sergey Valentinovich Biryukov. "With it we were able not only to accelerate the creation of new strains, but also to raise all selection work to a qualitatively new level."

Until recently the isolation of strains of highly productive grain crops was a matter for individual imminent scientists. They relied on their own intuition and their rich personal experience. The situation has changed now. The utilization of modern new laboratory equipment and the enlistment of specialists from various areas of natural science have made it possible to develop the theoretical problems of selection work in greater depth.

This is precisely the way scientists have recently isolated principally new intensive strains of winter wheat--Odesskaya polukarlikovaya, Yuzhnaya zarya, Obriy and Parus; barley--Druzhba and Pervenets; hybrid corn--Odesskaya-80 and Odesskaya-92; and sunflowers--Rassvet.

The economic effect has also been calculated. It exceeded 177 million rubles. One ruble of expenditures on research produced 700 rubles in profit.

11772

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## TILLING AND CROPPING TECHNOLOGY

### FUTURE USE OF TRITICALE DISCUSSED

Kishinev SOVETSKAYA MOLDAVIYA in Russian 30 Dec 80 p 4

[Article by I. Petrovskiy, chief of the main farming administration of the Moldavian SSR Ministry of Agriculture, and K. Grigorenko, chief of the inspection team of the state committee for strain testing of the Moldavian SSR: "Triticale Has a Future"]

[Text] "We have read," write our readers, G. Voronets and G. Gorobko, "that stores in the Ukraine have bread that is baked from triticale grain. We would like to know more about the advantages of this crop. Is it cultivated in Moldavia?"

Triticale is a hybrid of wheat and rye. It is not a product of natural evolution of grasses, but the result of man's selection activity. Triticale is sometimes called the grain of the future. This might be a bit of an exaggeration, but the advantages of the crop are obvious. Triticale has combined the traits of soft and durum wheat and rye. It is highly productive and frost resistant, its protein content is higher and, finally, it is resistant to a number of diseases.

Naturally, our republic has also displayed interest in this crop. In 1978 we imported seeds of the triticale strains Amfidiploid-1 and Odesskiy kormovoy, and a year later the Zhitnitsa-1 strain. The testing that has been conducted has produced contradictory results so far. In 1979 the yield of green mass from the Amfidiploid strain was 275-310 quintals per hectare. This year on the same strain testing sections it was considerably higher (280-456 quintals per hectare). But in terms of the grain yield per hectare at the Kutuzov strain testing station Amfidiploid did not exceed the standard and produced 32.6 quintals.

It was decided to continue strain testing. At the same time it is necessary to develop the corresponding agrotechnology. The fact is that agrotechnical recommendations developed for rye are not completely suitable for triticale. In order to reveal the genetic potential of triticale more fully it is necessary to have help from scientists. They must determine the planting times, the norm and depth of placement of the seeds, and the doses of fertilizers that are to be applied for our conditions, in a word, they must develop agrotechnical devices specifically for this hybrid.

Additionally, in order to conduct testing it is intended to expand the group of triticales strains, both from domestic and from foreign selection.

Triticale is an interesting and promising crop. It deserves the efforts necessary to give it an entry into production.

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CSO: 1824/167



## TILLING AND CROPPING TECHNOLOGY

### ADVANTAGES OF RAISING TRITICALE DISCUSSED

Dushanbe KOMMUNIST TADZHIKISTANA in Russian 9 Oct 82 p 3

[Article by A. Avazov, chairman of the Moskva Kolkhoz in Voseyskiy Rayon, and B. Umarov, head agronomist of the kolkhoz: "Triticale Has Advantages"]

[Text] For the second year we are obtaining 140-150 quintals of grain per hectare. How does one explain such large yields? The fact is that the kolkhoz has arranged labor cooperation with scientists, particularly with workers of the Institute of Plant Physiology and Biophysics of the Tajik SSR Academy of Sciences. We are speaking about a new, highly productive grain forage and feed crop--triticale.

The Vose-1 and Vose-2 strains of triticale that were created in the institute, with irrigation and on nonirrigated land and with winter plowing, produce large yields of grain and green mass.

In 1981-1982 the productivity of Vose-1 and Vose-2 amounted to an average of 60-65 quintals per hectare. After harvesting the triticale we planted the section in corn for grain. We obtained 85-90 quintals per hectare. And this amounted to 140-150 quintals of grain per hectare.

Triticale also did well on good nonirrigated land, where we obtained 28-30 quintals of grain per hectare. This is a 3-4-fold increase over the productivity of wheat under these conditions.

In addition to the large yields, the grain of the Vose-1 and Vose-2 strains are rich in dry and crude biomass. In the middle of April we obtained 600-700 quintals of green mass from each hectare. Another advantage of these strains is that they do not lodge with irrigation. According to preliminary calculations by specialists of the kolkhoz, the economic effectiveness from the introduction of triticale amounts to about 4,000 rubles per hectare.

Taking the experience of our kolkhoz and other farms into account, the oblast agricultural administration intends to increase the area planted in triticale to 3,000 hectares this year. Experimental production plantings of the Vose-1 and Vose-2 strains will be carried out under various conditions of our oblast using new methods for cultivation which were developed by scientists of the republic Academy of Sciences. With the new methods the Vose-2 strain already produced 95 quintals of grain per hectare this year.

The joint work of scientists and specialists open up new reserves for increasing the production of high-quality grain and they are a concrete contribution to the implementation of the Food Program.

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